REMARKS

STATUS OF THE CLAIMS

Claims 1-5, 7, 8, 10-18, and 38-49 were pending in this application.

Claims 1-3, 5, 7, 8, 10-18, 38-39, and 41-49 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 4,663,230 to Tennent.

Claims 4 and 40 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Tennent further in view of U.S. Patent No. 6,221,330 to Moy *et al.*

ADDRESSING THE EXAMINER'S REJECTIONS

REJECTIONS UNDER 35 U.S.C. § 103

(a) Claims 1-3, 5, 7, 8, 10-18, 38-39, and 41-49 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Tennent. Applicant traverses this ground of rejection.

Three requirements must be met for a prima facie case of obviousness. First, the prior art references must teach all the limitations of the claims. Second, there must be a motivation to modify the reference or combine the teachings to produce the claimed invention. Third, a reasonable expectation of success is required. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The cited reference does not disclose all the elements of the applicants' claims, therefore, a *prima facie* case of obviousness has not been made.

The Examiner acknowledges that Tennent fails to disclose entraining the catalyst in inert gas, but states that it would have been obvious to one of ordinary skill in the art because Tennet discloses contacting in the presence of hydrogen. The applicants disagree. Tennent at column 6, lines 13-20 states that the catalyst is deposited on refractory supports, such as alumina, carbon, quartz, silicates, and aluminum silicates. At column 6, lines 20-22, Tennent states that the refractory supports should be thin films or plates which can be easily moved into and out of the reactor. Tennent thus specifically teaches away from entraining the catalyst in an inert gas by teaching that the catalyst should be supported on a thin film or a plate for ease of removal. Such a

supported catalyst is not likely to be entrained in an inert gas, therefore, it would not have been obvious to one of skill in the art to entrain the catalyst in inert gas.

Further, Tennent in Examples 11-33 discloses the synthesis of the fibrils. In all of these examples, the supported catalyst is placed in the reaction chamber using refractory supports, and is not entrained in an inert gas. For example, Example 11 states that the "[c]atalyst prepared according to the method of Example 1 was ultrasonically dispersed in water and transferred to a ceramic boat. The boat was placed in the center of a 1" Vycor™ tube in an electric furnace at room temperature." Thus, the catalyst is placed in a ceramic boat, and not entrained in an inert gas.

The Examiner states that Tennent discloses contacting in the presence of hydrogen (column 4, lines 4-5), therefore it would have been obvious to entrain the catalyst in inert gas. The applicants disagree. The hydrogen gas used by Tennent is not an inert gas. Hydrogen gas is used in these reactions to activate the catalyst. The hydrogen gas and high temperature reduce the catalyst in preparation for the synthesis of fibers in the case of Tennent and single-walled carbon nanotubes in the case of the applicants. Thus, the Examiner has incorrectly asserted that hydrogen gas, as used by Tennent, is an inert gas. The use of a reactant gas to activate the catalyst does not suggest that the catalyst could be entrained in an inert gas.

The Examiner further argues that Tennet discloses "nano-sized" carbon fibers, "which would at least suggest a range of 0.5-5 μm." The applicants point out that the size limitation in their claims refers to the size of the catalyst on the powdered oxide support, and not to the product that is formed. Tennent does not disclose that the supported catalyst is nano-sized. Instead, Tennent discloses that the catalyst is supported on thin film or plate supports, which are not nano-sized. The Examiner has incorrectly read the nano-sized carbon fibers disclosed by Tennent to mean that this suggest a range of 0.5-5 μm for the catalyst used to make the product.

Finally, the independent claims 1 and 38 recite that the nanostructure is single-walled carbon nanotubes. Tennent discloses the synthesis of carbon fibril and not single-walled carbon nanotubes. Thus, Tennent does not disclose all the elements of the applicants' claims as amended. Therefore, a prima facie case of obviousness is not made. Withdrawal of this ground of rejection of claims 1-3, 5, 7, 8, 10-18, 38-39, and 41-49 is respectfully requested.

(b) Claims 4, 40, and 50 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Tennent further in view of Moy *et al.*

The applicants traverse the rejection as there is no motivation to modify the reference or combine the teachings to produce the claimed invention. Tennent discloses the use of supported catalyst for the synthesis of carbon fibrils. Moy at column 2, lines 65-67 states that "supported metal catalysts are inherently disadvantageous, as the support is necessarily incorporated into the single-walled carbon nanotube formed therefrom." Further, at column 4, lines 4-5, Moy states that their method to form single-walled carbon nanotubes uses unsupported catalysts. Thus, Moy teach away from using the supported catalysts of Tennent to synthesize single-walled carbon nanotubes. Therefore, a skilled artisan would not be motivated to combine Tennent with Moy.

The cited art does not teach or provide a motivation to combine the teachings. Therefore, a prima facie case of obviousness is not made. Withdrawal of this ground of rejection of now pending claims 4 and 40 is respectfully requested.

CONCLUSION

Withdrawal of the pending rejections and reconsideration of the claims are respectfully requested, and a notice of allowance is earnestly solicited. If the Examiner has any questions concerning this Response, the Examiner is invited to telephone Applicants' representative at (650) 335-7818.

Respectfully submitted,
AVETIK HARUTYUNYAN

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By: / Narinder Banait /
Narinder S. Banait, Reg. No. 43,482
Fenwick & West LLP
801 California Street
Mountain View, CA 94041
Telephone: 650-335-7818
Facsimile: 650-938-5200
E-mail: nbanait@fenwick.com